

7.2 Area Between Curves  
definition

$$\int_a^b f(x) dx - \int_a^b g(x) dx$$

$$\int_a^b f(x) - g(x) dx$$

top bottom

$$\Delta A = (f(x_i) - g(x_i)) \Delta x$$

$$A = \lim_{\Delta x \rightarrow 0} \sum (f(x_i) - g(x_i)) \Delta x$$

limit of Riemann Sum

Dec 14-9:13 PM

Find the area of the region between  $y = \sec^2 x$  and  $y = \sin x$  from  $x=0$  to  $x=\pi/4$

$$\int_0^{\pi/4} \sec^2 x - \sin x dx$$

$$\tan x + \cos x \Big|_0^{\pi/4}$$

$$\left( \tan \frac{\pi}{4} + \cos \frac{\pi}{4} \right) - (\tan 0 + \cos 0)$$

$$1 + \frac{\sqrt{2}}{2} - (0 + 1) = \frac{\sqrt{2}}{2}$$

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Find the area of the region enclosed by the parabola  $y=2-x^2$  and the line  $y=-x$ .

$$\int_{-1}^2 2 - x^2 - (-x) dx = \frac{9}{2}$$

$$2 - x^2 = -x$$

$$x^2 - x - 2 = 0$$

$$(x-2)(x+1) = 0$$

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Find the area bounded above by  $y = \sqrt{x}$  and below by the x-axis and the line  $y = x-2$

a) by integrating with respect to x  
b) by integrating with respect to y

$$\int_0^2 \sqrt{x} dx + \int_2^4 \sqrt{x} - (x-2) dx$$

$$\frac{10}{3}$$

$$\int_0^2 (\sqrt{y+2}) - y^2 dy$$

$$\frac{10}{3}$$

$\Delta A = (x_2 - x_1) \Delta y$

need x as a function of y

Dec 14-9:35 PM

area between 2 curves

$$\int_c^d g(y) - h(y) \, dy$$

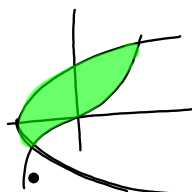
right hand
left

Dec 12-10:49 AM

Find the area of the region enclosed by the graphs of

$$y = x^3 \text{ and } x = y^2 - 2$$

$$x = \sqrt[3]{y} \quad y = \pm \sqrt{x+2}$$



$$\int_{-1}^{1.713} \sqrt[3]{y} - (y^2 - 2) \, dy$$

9.21

Dec 14-9:45 PM

Dec 18-7:22 AM